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*** It is now 2010/08/31 09:35:54 ***
(Dialog time 2010/08/31 08:35:54)

? b 155 biosci medicine 399

31aug10 07:36:08 User276629 Session D319.1
\$0.00 0.245 DialUnits File415
\$0.00 Estimated cost File415
\$0.06 INTERNET
\$0.06 Estimated cost this search
\$0.08 Estimated total session cost 0.245 DialUnits

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File 155:MEDLINE(R) 1950-2010/Aug 27
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 (c) 2010 BLHCIS
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 (c) format only 2002 Dialog
 File 162:Global Health 1983-2010/Sep W1
 (c) 2010 CAB International
 File 266:FEDRIP 2010/Jun
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 File 399:CA SEARCH(R) 1967-2010/UD=15310
 (c) 2010 American Chemical Society
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 File 444:New England Journal of Med. 1985-2010/Aug W4
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? e au=abraham t

Ref	Items	Index-term
E1	395	*AU=ABRAHAM T
E2	19	AU=ABRAHAM T A
E3	1	AU=ABRAHAM T C
E4	35	AU=ABRAHAM T E
E5	92	AU=ABRAHAM T EMILIA
E6	8	AU=ABRAHAM T J
E7	2	AU=ABRAHAM T J JR
E8	38	AU=ABRAHAM T JAWAHAR
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E10	11	AU=ABRAHAM T L

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	395	AU=ABRAHAM T
	35	AU=ABRAHAM T E
	92	AU=ABRAHAM T EMILIA
S1	522	AU='ABRAHAM T' OR AU='ABRAHAM T E' OR AU='ABRAHAM T EMILIA'

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	522	S1
	5024935	CRYSTAL?
S2	32	S1 AND CRYSTAL?

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>>>Invalid syntax

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3/5/1 (Item 1 from file: 155)

DIALOG(R)File 155: MEDLINE(R)

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16629234 PMID: 15967371

Biosensor for the determination of phenols based on cross-linked enzyme crystals (CLEC) of laccase.

Roy J Jegan; Abraham T Emilia; Abhijith K S; Kumar P V Sujith; Thakur M S
Bioactive Polymer Engineering Section, Polymer Science Division, Regional Research

Laboratory (CSIR), Trivandrum 695019, India.

Biosensors & bioelectronics (England) Jul 15 2005 , 21 (1) p206-11 , **ISSN:** 0956-5663--Print 0956-5663--Linking **Journal Code:** 9001289

Publishing Model Print

Document type: Journal Article; Research Support, Non-U.S. Gov't

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Subfile: INDEX MEDICUS

Cross-linked enzyme crystals (CLECs) are a versatile form of biocatalyst that can also be used for biosensor application. Laccase from *Trametes versicolor* (E.C.1.10.3.2) was crystallized, cross-linked and lyophilized with beta-cyclodextrin. The CLEC laccase was found to be highly active towards phenols like 2-amino phenol, guaiacol, catechol, pyrogallol, catechin and ABTS (non-phenolic). The CLEC laccase was embedded in 30% polyvinylpyrrolidone (PVP) gel and mounted into an electrode to make the sensor. The biosensor was used to detect the phenols in 50-1000 micromol concentration level.

Phenols with lower molecular weight such as 2-amino phenol, catechol and pyrogallol gave a short response time whereas the higher molecular weight substrates like catechin and ABTS had comparatively a long response time. The optimum pH of the analyte was 5.5-6.0 when catechol was used as substrate. The CLEC laccase retained good activity for over 3 months.

Descriptors: *Biosensing Techniques--instrumentation--IS; *Laccase; *Phenols--analysis --AN ; Biosensing Techniques--methods--MT; Calibration; Cross-Linking Reagents; Crystallization; Kinetics; Laccase--chemistry--CH; Polyporales--enzymology - -EN; Polyvinyls

CAS Registry No.: 0 (Cross-Linking Reagents); 0 (Phenols); 0 (Polyvinyls)

Enzyme No.: EC 1.10.3.2 (Laccase)

Record Date Created: 20050621

Record Date Completed: 20080305

Dialog eLink: 

3/5/2 (Item 2 from file: 155)

DIALOG(R)File 155: MEDLINE(R)

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15028854 **PMID:** 12396133

Degradation of textile dyes mediated by plant peroxidases.

Shaffiqu T S; Roy J Jegan; Nair R Aswathi; Abraham T Emilia

Biochemical Processing Section, Regional Research Laboratory (CSIR),
Thiruvananthapuram, India.

Applied biochemistry and biotechnology (United States) Jul-Dec 2002 , 102-103 (1-6) p315-26 , **ISSN:** 0273-2289--Print 0273-2289--Linking **Journal Code:** 8208561

Publishing Model Print

Document type: Journal Article; Research Support, Non-U.S. Gov't

Languages: ENGLISH

Main Citation Owner: NLM

Record type: MEDLINE; Completed

Subfile: INDEX MEDICUS; Toxbib

The peroxidase enzyme from the plants *Ipomea palmata* (1.003 IU/g of leaf) and *Saccharum spontaneum* (3.6 IU/g of leaf) can be used as an alternative to the commercial source of horseradish and soybean peroxidase enzyme for the decolorization of textile dyes, mainly azo dyes. Eight textiles dyes currently used by the industry and seven other dyes were selected for decolorization studies at 25-200 mg/L levels using these plant enzymes. The enzymes were purified prior to use by ammonium sulfate precipitation, and ion exchange and gel permeation chromatographic techniques. Peroxidase of *S. spontaneum* leaf (specific activity of 0.23 IU/mg) could completely degrade Supranol Green and Procion Green HE-4BD (100%) dyes within 1 h, whereas Direct Blue, Procion Brilliant Blue H-7G and Chrysoidine were degraded >70% in 1 h. Peroxidase of *Ipomea* (*I. palmata* leaf; specific activity of 0.827 U/mg) degraded 50 mg/L of the dyes Methyl Orange (26%), Crystal Violet (36%), and Supranol Green (68%) in 2-4 h and Brilliant Green (54%), Direct Blue (15%), and Chrysoidine (44%) at the 25 mg/L level in 1 to 2 h of treatment. The *Saccharum* peroxidase was immobilized on a hydrophobic matrix. Four textile dyes, Procion Navy Blue HER, Procion Brilliant Blue H-7G, Procion Green HE-4BD, and Supranol Green, at an initial concentration of 50 mg/L were completely degraded within 8 h by the enzyme immobilized on the modified polyethylene matrix. The immobilized enzyme was used in a batch reactor for the degradation of Procion Green HE-4BD and the reusability was studied for 15 cycles, and the half-life was found to be 60 h.

Descriptors: *Coloring Agents--metabolism--ME; **Ipomoea*--enzymology--EN; *Peroxidases --metabolism--ME; *Plant Proteins--metabolism--ME; **Saccharum*--enzymology --EN ; Azo Compounds--chemistry--CH; Azo Compounds--metabolism--ME; Biodegradation, Environmental; Color; Enzymes, Immobilized--metabolism--ME; Horseradish Peroxidase--metabolism--ME; Hydrogen-Ion Concentration; Peroxidases--chemistry--CH; Plant Proteins--chemistry--CH; Polyethylene --chemistry--CH; Textiles

CAS Registry No.: 0 (Azo Compounds); 0 (Coloring Agents); 0 (Enzymes, Immobilized); 0 (Plant Proteins); 9002-88-4 (Polyethylene)

Enzyme No.: EC 1.11.1.- (Horseradish Peroxidase); EC 1.11.1.- (Peroxidases)

Record Date Created: 20021024

Record Date Completed: 20030521

Dialog eLink: 

3/5/3 (Item 1 from file: 5)

DIALOG(R)File 5: Biosis Previews(R)

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0020077407 **Biosis No.:** 200800124346

Studies on crystallization and cross-linking of lipase for biocatalysis

Author: Rajan Akhila; Abraham T Emilia (Reprint)

Author Address: CSIR, Reg Res Lab, Chem Sci and Technol Div, Trivandrum 695019, Kerala, India**India

Author E-mail Address: emiliatea@yahoo.com

Journal: Bioprocess and Biosystems Engineering 31 (2): p 87-94 FEB 2008 2008

Item Identifier: doi:10.1007/s00449-007-0149-5

ISSN: 1615-7591

Document Type: Article

Record Type: Abstract

Language: English

Abstract: The development of robust biocatalysts with increased stability and activity is a major challenge to industry. A major breakthrough in this field was the development of cross-linked enzyme crystals with high specificity and stability. A method is described to produce micro crystals of CLEC lipase, which is thermostable and solvent stable. Lipase from Burkholderia cepacia was crystallized using ammonium sulfate and cross-linked with glutaraldehyde to produce catalytically active enzyme. The maximum yield of CLEC was obtained with 70% ammonium sulfate and cross-linked with 5% (v/v) glutaraldehyde. SEM studies showed small hexagonal-shaped crystals of 2-5 μ m size. CLEC lipase had improved thermal and reuse stability. It is versatile, having good activity in both polar and nonpolar organic solvents. CLEC lipase was coated using beta cyclodextrin for improving the storage and reuse stability. CLEC was successfully used for esterification of Ibuprofen and synthesis of ethyl butyrate.

Registry Numbers: 111-30-8: glutaraldehyde; 7585-39-9: beta-cyclodextrin; 7783-20-2: ammonium sulfate; 9001-62-1: lipase; 105-54-4: ethyl butyrate

Enzyme Commission Number: EC 3.1.1.3: lipase

DESCRIPTORS:

Major Concepts: Methods and Techniques; Enzymology--Biochemistry and Molecular Biophysics

Biosystematic Names: Pseudomonadaceae--Gram-Negative Aerobic Rods and Cocci, Eubacteria, Bacteria, Microorganisms

Organisms: Burkholderia cepacia (Pseudomonadaceae)

Common Taxonomic Terms: Bacteria; Eubacteria; Microorganisms

Chemicals & Biochemicals: glutaraldehyde; beta-cyclodextrin; ammonium sulfate; lipase; ethyl butyrate

Methods & Equipment: enzyme crystallization--laboratory techniques

Miscellaneous Terms: Concept Codes: biocatalysis

Concept Codes:

10060 Biochemistry studies - General

10068 Biochemistry studies - Carbohydrates

10802 Enzymes - General and comparative studies: coenzymes

31000 Physiology and biochemistry of bacteria

Biosystematic Codes:

06508 Pseudomonadaceae

Dialog eLink: <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&term=0019862522>

3/5/4 (Item 2 from file: 5)

DIALOG(R)File 5: Biosis Previews(R)

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0019862522 **Biosis No.:** 200700522263

Physico-chemical characterization of starch ferulates of different degrees of substitution

Author: Mathew Sindhu; Abraham T Emilia (Reprint)

Author Address: CSIR, Reg Res Lab, Chem Sci and Technol Div, Trivandrum 695019, Kerala, India**India

Author E-mail Address: emiliatea@yahoo.com

Journal: Food Chemistry 105 (2): p 579-589 2007 2007

Item Identifier: doi:10.1016/j.foodchem.2007.04.032

ISSN: 0308-8146

Document Type: Article

Record Type: Abstract

Language: English

Abstract: Starch ferulates were prepared by reacting potato starch with ferulic acid chloride, using pyridine as a catalyst in dimethyl sulfoxide. Starch ferulates of different degrees of substitution (DS) were prepared and their formation was confirmed by the presence of the carbonyl signal around 1726 cm⁻¹ in the FT-IR spectra. The thermal characteristics of the native starch and starch ferulates of different degrees of substitution were studied using TGA, DTG and DSC and the studies revealed the starch ferulates to be thermally more stable than the native starch. The starch esters exhibited 50% weight loss at temperatures from 332 to 375 degrees C while the native starch underwent 50% weight loss at 321 degrees C. The H-1 and C-13 NMR studies confirmed the structure of the modified starch. X-ray diffraction studies revealed the loss of the ordered B-type crystalline structure, characteristic of potato starch. The microstructural imaging of the starch esters exhibited a networking which was enhanced with increasing degree of substitution. The starch ferulates also exhibited DPPH radical and ABTS radical cation-scavenging activity. (c) 2007 Elsevier Ltd. All rights reserved.

Registry Numbers: 67-68-5: DMSO; 110-86-1: pyridine

DESCRIPTORS:

Major Concepts: Biochemistry and Molecular Biophysics; Foods

Biosystematic Names: Solanaceae--Dicotyledones, Angiospermae, Spermatophyta, Plantae

Organisms: potato (Solanaceae)

Common Taxonomic Terms: Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants

Chemicals & Biochemicals: DMSO; carbonyl; pyridine; starch ferulate; ferulic acid chloride

Miscellaneous Terms: Concept Codes: potato--vegetable; physico-chemical

characterization; differential degree substitution

Concept Codes:

10060 Biochemistry studies - General

13502 Food technology - General and methods

13504 Food technology - Fruits, nuts and vegetables

51522 Plant physiology - Chemical constituents

Biosystematic Codes:

26775 Solanaceae

Dialog eLink:

[Biosis Previews\(R\) Technical Edition](#)

3/5/5 (Item 3 from file: 5)

DIALOG(R)File 5: Biosis Previews(R)

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0019468536 **Biosis No.:** 200700128277

Continuous biotransformation of pyrogallol to purpurogallin using cross-linked enzyme crystals of laccase as catalyst in a packed-bed reactor

Author: Roy J Jegan; Abraham T Emilia (Reprint)

Author Address: CSIR, Reg Res Lab, Div Chem Sci, Trivandrum 695019, Kerala, India**India

Author E-mail Address: emiliatea@yahoo.com

Journal: Journal of Chemical Technology and Biotechnology 81 (11): p 1836-1839
NOV 2006 2006

ISSN: 0268-2575

Document Type: Article

Record Type: Abstract

Language: English

Abstract: Cross-linked enzyme crystals (CLEC) of laccase were prepared by crystallizing laccase with 75% (NH₄)₂SO₄ and cross-linking using 1.5% glutaraldehyde. The cross-linked enzyme crystals were further coated with 1 mmol L⁻¹ beta-cyclodextrin by lyophilization. The lyophilized enzyme crystals were used as such for the biotransformation of pyrogallol to purpurogallin in a packed-bed reactor. The maximum conversion (76.28%) was obtained with 3 mmol L⁻¹ pyrogallol at a residence time of 7.1 s. The maximum productivity (269.03 g L⁻¹ h⁻¹) of purpurogallin was obtained with 5 mmol L⁻¹ pyrogallol at a residence time of 3.5 s. The productivity was found to be 261.14 g L⁻¹ h⁻¹ and 251.1 g L⁻¹ h⁻¹ when concentrations of 3 mmol L⁻¹ and 7 mmol L⁻¹ respectively were used. The reaction rate of purpurogallin synthesis was maximum (2241.94 mg purpurogallin mg⁻¹ CLEC h⁻¹) at a residence time of 3.5 s, when 5 mmol L⁻¹ pyrogallol was used as the substrate. The catalyst to product ratio calculated for the present biotransformation was 1:2241. The CLEC laccase had very high stability in reuse and even after 650 h of continuous use, the enzyme did not lose its activity. (c) 2006 Society of Chemical Industry.

Registry Numbers: 111-30-8: glutaraldehyde; 7585-39-9: beta-cyclodextrin; 7783-20-2: ammonium sulfate; 87-66-1: pyrogallol; 569-77-7: purpurogallin; 80498-15-3: laccase

DESCRIPTORS:

Major Concepts: Bioprocess Engineering

Chemicals & Biochemicals: glutaraldehyde; beta-cyclodextrin; ammonium sulfate; pyrogallol; purpurogallin; laccase

Miscellaneous Terms: Concept Codes: packed-bed reactor

Concept Codes:

10060 Biochemistry studies - General

10068 Biochemistry studies - Carbohydrates

10802 Enzymes - General and comparative studies: coenzymes

39008 Food microbiology - General and miscellaneous

Dialog eLink:



3/5/6 (Item 4 from file: 5)

DIALOG(R)File 5: Biosis Previews(R)

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18921143 **Biosis No.:** 200600266538

Preparation and characterization of cross-linked enzyme crystals of laccase

Author: Roy J Jegan; Abraham T Emilia (Reprint)

Author Address: CSIR, Reg Res Lab, Div Chem Sci, Trivandrum 695019, Kerala, India**India

Author E-mail Address: einiliatea@yahoo.com

Journal: Journal of Molecular Catalysis B Enzymatic 38 (1): p 31-36 JAN 2 2006
2006

ISSN: 1381-1177

Document Type: Article

Record Type: Abstract

Language: English

Abstract: Laccase from *Trametes versicolor* was crystallized using ammonium sulphate and the resultant crystals on cross-linking with glutaraldehyde produced insoluble and catalytically active enzyme. These cross-linked enzyme crystals (CLEC) of laccase had improved thermal stability (fourfold) than the native enzyme. The half-life of CLEC laccase at 60 degrees C was 123 min compared to 24 min for the soluble enzyme. The kinetics of oxidation reactions catalyzed by CLEC laccase was studied using various substrates 2,2'-azino-bis(3-ethylbenz-thiazoline-6-sulphonic acid) (ABTS), guaiacol, catechol, pyrogallol, syringaldazine and catechin. ABTS was found to be the best substrate for CLEC laccase ($K_m = 0.859$ mM) and had a catalytic efficiency ($k(cat)/K_m = 3.73 \times 10(3)$) higher than the other substrates. The CLEC laccase showed lower specific activity, V_{max} and $k(cat)$ values than the native enzyme for all the substrate studied and this may be due to the partial inactivation of laccase crystals by glutaraldehyde, and also the diffusion limitation of the substrate through the channels in the cross-linked crystal

structure of laccase enzyme. CLEC laccase had a higher activity in non-polar organic solvents like hexane, toluene, isoctane and cyclohexane. The preparation and characterization of CLEC laccase is reported for the first time. (c) 2005 Elsevier B.V. All rights reserved.

Registry Numbers: 111-30-8: glutaraldehyde; 7783-20-2: ammonium sulfate; 154-23-4: catechol; 110-54-3: hexane; 108-88-3: toluene; 80498-15-3: laccase; 90-05-1: guaiacol; 87-66-1: pyrogallol; 14414-32-5: syringaldazine; 100786-01-4: catechin; 26635-64-3: isoctane; 110-82-7: cyclohexane

Enzyme Commission Number: EC 1.10.3.2: laccase

DESCRIPTORS:

Major Concepts: Enzymology--Biochemistry and Molecular Biophysics; Bioprocess Engineering

Biosystematic Names: Basidiomycetes--Fungi, Plantae

Organisms: Trametes versicolor (Basidiomycetes)

Common Taxonomic Terms: Fungi; Microorganisms; Nonvascular Plants; Plants

Chemicals & Biochemicals: glutaraldehyde; ammonium sulfate; catechol--substrate; hexane--organic solvent; toluene--organic solvent; laccase--oxidation, catalysis, crystallization, kinetics, half-life; 2,2'-azino-bis(3-ethylbenz-thiazoline-6-sulphonic acid) {ABTS}--substrate; guaiacol--substrate; pyrogallol--substrate; syringaldazine--substrate; catechin--substrate; isoctane--organic solvent; cyclohexane--organic solvent

Methods & Equipment: enzyme crystal cross-linking--laboratory techniques

Miscellaneous Terms: Concept Codes: thermal stability

Concept Codes:

10060 Biochemistry studies - General

10802 Enzymes - General and comparative studies: coenzymes

39008 Food microbiology - General and miscellaneous

51518 Plant physiology - Enzymes

Biosystematic Codes:

15300 Basidiomycetes

Dialog eLink:



3/5/7 (Item 5 from file: 5)

DIALOG(R)File 5: Biosis Previews(R)

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11839449 **Biosis No.:** 199396003865

Stabilization of paste viscosity of cassava starch by heat moisture treatment

Author: Abraham T Emilia

Author Address: Fermentation Sect., Regional Res. Lab., Trivandrum, Kerala, India 659019, india**india

Journal: Starch 45 (4): p 131-135 1993

ISSN: 0038-9056

Document Type: Article

Record Type: Abstract

Language: English

Abstract: Cassava starch has poor paste stability during prolonged cooking. The starch was modified by heat moisture treatment. A premoistured starch (18-24% moisture) was subjected to heat treatment for 3-16 h to bring about paste stability. Different types of heat treatments like moist pressure heating, dry heating and microwave heating was tried. The optimum heat treatment to bring about the paste stability was found to be 18-21% premoistured starch, which was heated at 110 degree C per 16 h. The modified starch granules were intact and had comparatively increased sedimentation volume, oil binding capacity, amylase susceptibility, and decreased crystallinity, water binding capacity, solubility and paste translucency. The freeze- thaw stability was excellent with modified cassava starch. Pie filling and "Halwa" (an Indian sweetmeat) made from modified cassava starch had good organoleptic properties.

Registry Numbers: 9005-25-8: STARCH

DESCRIPTORS:

Major Concepts: Anthropology; Biochemistry and Molecular Biophysics; Foods

Biosystematic Names: Euphorbiaceae--Dicotyledones, Angiospermae, Spermatophyta, Plantae; Plantae --Plantae

Organisms: Euphorbiaceae (Euphorbiaceae); plant (Plantae)

Common Taxonomic Terms: Angiosperms; Dicots; Spermatophytes; Vascular Plants; Plants

Chemicals & Biochemicals: STARCH

Miscellaneous Terms: Concept Codes: food industry; COOKING TEMPERATURE; ETHNIC FOOD; FOOD CHEMISTRY; HALWA; ORGANOLEPTIC PROPERTIES; PIE FILLING; STARCH

Concept Codes:

05000 Physical anthropology and ethnobiology

10068 Biochemistry studies - Carbohydrates

10618 External effects - Temperature as a primary variable - hot

13502 Food technology - General and methods

13516 Food technology - Meats and meat by-products

13530 Food technology - Evaluations of physical and chemical properties

13532 Food technology - Preparation, processing and storage

20001 Sense organs - General and methods

Biosystematic Codes:

26055 Euphorbiaceae

11000 Plantae

Dialog eLink:



3/5/8 (Item 1 from file: 34)

DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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20363351 **Genuine Article#:** 566DR **Number of References:** 44

Title: Localization of DNA and RNA in Eosinophil Secretory Granules

Author: Behzad AR; Walker DC; Abraham T; McDonough J; Mahmudi-Azer S; Chu F; Shaheen F; Hogg JC; Pare PD (REPRINT)

Author Email Address: ppare@mrl.ubc.ca

Corporate Source: St Pauls Hosp, James Hogg iCAPTURE Ctr Cardiovasc & Pulm Res, Burrard Bldg, Room 166, 1081 Burrard St/Vancouver/BC V6Z 1Y6/Canada/ (REPRINT); Univ British Columbia, St Pauls Hosp, Dept Med, James Hogg iCAPTURE Ctr, Vancouver/BC V5Z 1M9/Canada/; Univ British Columbia, St Pauls Hosp, Dept Pathol, James Hogg iCAPTURE Ctr, Vancouver/BC V5Z 1M9/Canada/

Journal: INTERNATIONAL ARCHIVES OF ALLERGY AND IMMUNOLOGY , 2010 , V 152 , N1 , P 12-27

ISSN: 1018-2438 **Publication Date:** 20100000

Digital Object Identifier: [10.1159/000260079](https://doi.org/10.1159/000260079)

Publisher: KARGER , ALLSCHWILERSTRASSE 10, CH-4009 BASEL, SWITZERLAND

Language: English **Document Type:** ARTICLE

Geographic Location: Canada

Journal Subject Category: ALLERGY; IMMUNOLOGY

Abstract: Background: Although the accepted paradigm is that the proteins stored in eosinophil crystalloid granules are translated from messenger RNA transcribed in the cell nucleus, recent ultrastructural evidence suggests that protein synthesis may also take place within eosinophilic granules. Methods: We used 2 different methods to detect the presence of DNA and RNA in eosinophil secretory granules. Using bromodeoxyuridine, a thymidine analogue, and bromouridine, a uracil analogue, we labeled the DNA and RNA in eosinophils *in vivo* in rabbits. Immunoelectron microscopy to localize these molecules was performed on ultrathin sections of blood and bone marrow eosinophils using monoclonal anti-bromodeoxyuridine antibody with IgG as a control. The immunogold grain density was measured in each subcellular compartment within the eosinophils and analyzed using image analysis software. A combination of DNA/CD63 immunofluorescence staining and a fluorescently labeled molecular probe that stains RNA was used to examine the presence of DNA and RNA in the secretory granules of human blood eosinophils. Results: The mean density of bromodeoxyuridine-labeled DNA and bromouridine-labeled RNA immunogold grains in the secretory granules of blood and bone marrow eosinophils were significantly higher ($p < 0.0005$) than cytoplasmic or background staining. We also demonstrated the existence of DNA and RNA in the CD63-positive secretory granules of human peripheral blood eosinophils by means of immunofluorescent staining and a fluorescently labeled molecular probe. Conclusions: These results provide evidence that eosinophil granules are the site of DNA and RNA synthesis and suggest the potential for a new role(s) for eosinophil-secretory granules.

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Descriptors: SCIAuthor Keywords: Bromodeoxyuridine ; Bromouridine ; Immunogold staining ; SYTO RNA-select fluorescent dye

Identifiers: KeyWord Plus(R): MAST-CELL GRANULES; ULTRASTRUCTURAL ANALYSIS; BOND FORMATION; TRANSCRIPTION; RIBONUCLEASE;

RELEASE; BIOLOGY; LEUKOCYTE; NUCLEUS; PROTEIN

Cited References:

BAINTON D, 1998, INFLAMMATION BASIC P
BERINGER M, 2007, V26, P311, MOL CELL
CMARKO D, 1999, V10, P211, MOL BIOL CELL
DOHERTY EA, 2001, V30, P457, ANNU REV BIOPH BIOM
DOHERTY EA, 2001, V8, P339, NAT STRUCT BIOL
DVORAK AM, 1991, SUBCELLULAR MORPHOLO
DVORAK AM, 1998, V46, P695, J HISTOCHEM CYTOCHEM
DVORAK AM, 2000, V48, P1, J HISTOCHEM CYTOCHEM
DVORAK AM, 2000, V122, P124, INT ARCH ALLERGY IMM
DVORAK AM, 2000, V76, P1, CHEM IMMUNOL
DVORAK AM, 2000, V32, P685, HISTOCHEM J
DVORAK AM, 2001, V179, P94, IMMUNOL REV
GHOSH S, 1998, V22, P609, CELL BIOL INT
GLEICH GJ, 1993, V44, P85, ANNU REV MED
GOTO Y, 2003, V285, PC253, AM J PHYSIOL-CELL PH
HOZAK P, 1994, V107, P639, J CELL SCI 2
JAUNIN F, 2000, V260, P313, EXP CELL RES
JOHNSTON WK, 2001, V292, P1319, SCIENCE
KLEMENTSSON H, 1992, V22, P1058, CLIN EXP ALLERGY
LACY P, 2000, V76, P134, CHEM IMMUNOL
MAHMUDIAZER S, 2002, V99, P4039, BLOOD
MATSUMOTO K, 1999, V120, P38, INT ARCH ALLERGY S1
MOMMA S, 2002, V119, P59, J NEUROSCI METH
MYRDAL SE, 2005, V204, P156, HEARING RES
NEVES JS, 2008, V105, P18478, P NATL ACAD SCI USA
NGWENYA LB, 2005, V53, P821, J HISTOCHEM CYTOCHEM
OMER AD, 2003, V48, P617, MOL MICROBIOL
OVINGTON KS, 1997, V92, P93, MEM I OSWALDO CRUZ S
PALMER TD, 2000, V425, P479, J COMP NEUROL
PEACHMAN KK, 2001, V98, P1717, P NATL ACAD SCI USA
PUVION E, 1996, V229, P217, EXP CELL RES
ROTHENBERG ME, 2006, V24, P147, ANNU REV IMMUNOL
SIMON D, 2004, V59, P561, ALLERGY
SORRENTINO S, 1991, V288, P23, FEBS LETT
SORRENTINO S, 1992, V267, P14859, J BIOL CHEM
SZYMANSKI M, 2003, V44, P1, J APPL GENET
TARASOW TM, 1997, V389, P54, NATURE
TERASHIMA T, 1996, V271, PL587, AM J PHYSIOL-LUNG C
UNRAU PJ, 1998, V395, P260, NATURE
WANSINK DG, 1994, V19, P109, MOL BIOL REP
WARDLAW AJ, 1995, V60, P151, ADV IMMUNOL
WICKRAMASINGHE SN, 1978, V38, P179, BRIT J HAEMATOL
YOUSEFI S, 2008, V14, P949, NAT MED

Dialog eLink: [View record in Dialog](#)

3/5/9 (Item 2 from file: 34)

DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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17760733 **Genuine Article#:** 295BY **Number of References:** 49

Title: Thermomechanical and rheological properties of high-molecular-weight poly(ethylene oxide)/novolac blends

Author: Ratna D (REPRINT) ; Abraham T; Karger-Kocsis J

Corporate Source: Tech Univ Kaiserslautern,Inst Verbundwerkstoffe GmbH,Erwin Schrondinger Str 58/D-67663 Kaiserslautern//Germany/ (REPRINT); Tech Univ Kaiserslautern,Inst Verbundwerkstoffe GmbH,D-67663 Kaiserslautern//Germany/ ; Tech Univ Kaiserslautern,Inst Composite Mat,D-67663 Kaiserslautern//Germany/; Naval Mat Res Lab,Ambernath 421506//India/

Journal: MACROMOLECULAR CHEMISTRY AND PHYSICS , 2008 , V 209 , N7 (APR 4) , P 723-733

ISSN: 1022-1352 **Publication Date:** 20080404

Publisher: WILEY-V C H VERLAG GMBH , PO BOX 10 11 61, D-69451 WEINHEIM, GERMANY

Language: English **Document Type:** ARTICLE

Geographic Location: Germany; India

Journal Subject Category: POLYMER SCIENCE

Abstract: Blends of poly(ethylene oxide) (PEO) and novolac-type phenolic resin were investigated for potential use as a crystallizable switching component for shape-memory polymer systems with adjustable switching temperature. High-molecular-weight PEO and novolac blends with low novolac content were studied. Dynamic and isothermal DSC studies indicated a significant decrease in the crystallization temperature as a result of incorporation of novolac. We investigated the spherulitic morphology using a cross-polarized optical microscopy and found a decrease in size and regularity of the spherulites with increasing novolac content. The rheological and mechanical properties corroborated the existence of strong interactions through H-bonding in the amorphous phase.

Descriptors: SCIAuthor Keywords: blends ; differential scanning calorimetry (DSC) ; novolac ; optical microscopy ; poly(ethylene oxide) ; shape memory polymers

Identifiers: KeyWord Plus(R): SHAPE-MEMORY POLYMERS; MECHANICAL-PROPERTIES; METHACRYLATE) BLENDS; MELTING BEHAVIOR; COPOLYMER BLENDS; THERMAL-BEHAVIOR; EPOXY-RESIN; OXIDE); NANOCOMPOSITES; CRYSTALLIZATION

Cited References:

ALFANSO GC, 1986, V19, P1143, MACROMOLECULES

ARANDA P, 2003, V41, P3249, J POLYM SCI POL PHYS

BEHL M, 2007, V10, P20, MATER TODAY

BRISSON J, 2004, V44, P241, POLYM ENG SCI
CAI H, 2003, V44, P1481, POLYMER
CHEN HW, 2001, V42, P9763, POLYMER
CHOI HJ, 2001, V22, P320, MACROMOL RAPID COMM
CHOI HJ, 1995, V35, P1636, POLYM ENG SCI
CHU PP, 2004, V42, P3866, J POLYM SCI POL PHYS
CIMMINO S, 1989, V27, P1781, J POLYM SCI POL PHYS
CUI LM, 2007, V106, P811, J APPL POLYM SCI
DIONISIO M, 2000, V33, P1002, MACROMOLECULES
FERRETTI A, 2005, V45, P1385, POLYM ENG SCI
FOX TG, 1956, V1, P123, B AM PHYS SOC
GOULD P, 2007, V10, P10, MAT TODAY
KALKAR AK, 2007, V106, P35, J APPL POLYM SCI
KIM BK, 1996, V37, P5781, POLYMER
KIM BS, 2005, P521, HDB CONDENSATION THE
KOSONEN H, 2002, V203, P388, MACROMOL CHEM PHYSIC
KUO SW, 2002, V35, P278, MACROMOLECULES
KWOK AY, 2004, V16, P5650, CHEM MATER
LANGER R, 2004, V428, P487, NATURE
LARSON RG, 1999, STRUCTURE RHEOLOGY O
LENDLEIN A, 2002, V41, P2034, ANGEW CHEM INT EDIT
LIU C, 2007, V17, P1543, J MATER CHEM
LIU GQ, 2005, V26, P649, MACROMOL RAPID COMM
LOYENS W, 2005, V46, P903, POLYMER
LUO XL, 1997, V64, P2433, J APPL POLYM SCI
MARTUSCELLI E, 1984, V24, P563, POLYM ENG SCI
MARTUSCELLI E, 1984, V25, P1097, POLYMER
MARTUSCELLI E, 1985, V186, P2161, MAKROMOL CHEM
MISHRA R, 1998, V106, P113, SOLID STATE IONICS
NIELSON L, 1997, POLYM RHEOLOGY
STEFANESCU EA, 2006, V8, P1739, PHYS CHEM CHEM PHYS
RATNA D, 2001, V41, P1815, POLYM ENG SCI
RATNA D, 2004, V53, P1882, POLYM INT
RATNA D, 2007, V56, P900, POLYM INT
RATNA D, 2006, V47, P4068, POLYMER
SONG YS, 2006, V46, P1350, POLYM ENG SCI
STEFANESCU EA, 2006, V47, P7339, POLYMER
TALIBUDDIN S, 1996, V29, P7527, MACROMOLECULES
VAIA RA, 1995, V7, P154, ADV MATER
WANG MT, 1999, V37, P101, J POLYM SCI POL PHYS
WEN ZY, 2003, V119, P427, J POWER SOURCES
WINTER HH, 1997, V134, P165, ADV POLYM SCI
WU HD, 1999, V32, P3097, MACROMOLECULES
XIONG Y, 1997, V38, P4817, POLYMER
YANG XQ, 1995, V54, P198, J POWER SOURCES

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DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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16957772 **Genuine Article#:** 214EY **Number of References:** 24

Title: Oil distribution in iPP/EPDM thermoplastic vulcanizates

Author: Abraham T; Barber NG; Mallamaci MP

Journal: RUBBER CHEMISTRY AND TECHNOLOGY , 2007 , V 80 , N2 (MAY-JUN) , P 324-339

ISSN: 0035-9475 **Publication Date:** 20070500

Publisher: AMER CHEMICAL SOC INC , RUBBER DIV UNIV AKRON PO BOX 499, AKRON, OH 44309-0499 USA

Language: English **Document Type:** ARTICLE

Journal Subject Category: POLYMER SCIENCE

Abstract: Scanning Probe Microscopy (SPM) was used to determine the volume fraction of oil-swollen particulate rubber and oil-swollen plastic in thermoplastic vulcanizates (TPVs) produced from iPP and EPDM rubber. Sample preparation and SPM imaging conditions allowed the ratio of the rubber and plastic area imaged for a TPV sample to be equated to the phase volume ratio. The hydrosilylation cured TPVs contained no filler or inorganic components (other than about 1 ppm of platinum catalyst, based on dry rubber) that would decrease the accuracy of the SPM analysis. The accuracy of the SPM method used for TPV phase volume determination was established by analysis of an oil-free TPV of known composition. The densities of the individual TPV components (rubber, oil, crystalline and amorphous plastic phase), which were assumed to be additive in the composite, were used to calculate the oil distribution between the TPV rubber and plastic phase, since the volumes of the individual components (the extent of plastic crystallinity was measured by differential scanning calorimetry) were known.

Thus, the amount of oil in the oil-swollen TPV rubber and plastic phase could be quantified. This information, coupled with the Tg of the oil-swollen amorphous plastic phase, indicated that a substantial amount of oil was present as a separate oil phase that is surrounded by the oil-swollen amorphous plastic phase. To date, it has been assumed that the oil in a TPV partitions between the rubber and amorphous plastic phase, with the plastic crystallites being oil free. This work is the first demonstration of the presence of a separate oil phase in TPVs, and the first accurate determination of the oil content in the oil-swollen rubber, miscible oil in the oil-swollen amorphous plastic, and the free oil in TPVs.

Identifiers: KeyWord Plus(R): ISOTACTIC POLYPROPYLENE; ELASTOMER BLENDS; POLYETHYLENE; COPOLYMER

Cited References:

US 4539256, 1985, SHIPMAN GH

ABRAHAM T, 2004, P197, RUBBER COMPOUNDING C
ABRAHAM T, 2004, P224, RUBBER COMPOUNDING C
CHAFFIN KA, 2000, V38, P108, J POLYM SCI POL PHYS
DELESSEE CR, 1847, V25, P544, ACAD SCI PARIS
ELLUL MD, 1998, V71, P244, RUBBER CHEM TECHNOL
FRIED JR, 1995, P161, POLYM SCI TECHNOL
HOLDEN G, 2004, PCH2, THERMOPLASTIC ELASTO
JAYARAMAN K, 2004, V93, P113, J APPL POLYM SCI
KALFOGLOU NK, 1985, V129, P103, ANGEW MAKROMOL CHEM
LEUTWYLER K, 1998, SCI AM 0914
LIM GBA, 1991, V64, P31, J MEMBRANE SCI
LLOYD DR, 1989, V261, P28, AIChE S SER
MADER D, 1999, V32, P1252, MACROMOLECULES
MOORE EP, 1996, P126, POLYPROPYLENE HDB
NITTA KH, 2004, 021, E-POLYMERS 0422
OHLSSON B, 1996, V36, P501, POLYM ENG SCI
OSSWALD TA, 1995, P69, MAT SCI POLYM ENG
POON BC, 2004, V45, P893, POLYMER
RUSS JC, 2002, P445, IMAGE PROCESSING HDB
SENGUPTA P, 2005, V46, P12298, POLYMER
SENGERS WGF, 2005, V46, P6391, POLYMER
SUN T, 2001, V34, P6812, MACROMOLECULES
WARD IM, 2004, P203, MECH PROPERTIES SOLI

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3/5/11 (Item 4 from file: 34)

DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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16215136 Genuine Article#: 143PP Number of References: 29

Title: Neutron diffraction study of *Pseudomonas aeruginosa* lipopolysaccharide bilayers

Author: Abraham T (REPRINT) ; Schooling SR; Nieh MP; Kucerka N; Beveridge TJ; Katsaras J

Corporate Source: Natl Res Council Canada,Canadian Neutron Beam Ctr,Chalk River/ON K0J 1J0/Canada/ (REPRINT); Natl Res Council Canada,Canadian Neutron Beam Ctr,Chalk River/ON K0J 1J0/Canada/; Univ Guelph,Dept Mol & Cellular Biol,Guelph/ON N1G 2W1/Canada/; Univ Guelph,Biophys Interdept Grp,Guelph/ON N1G 2W1/Canada/; Univ Guelph,Guelph Waterloo Phys Inst,Guelph/ON N1G 2W1/Canada/; Networks Ctr Excellence,Adv Food & Mat Network,Guelph/ON N1G 2W1/Canada/; Brock Univ,Dept Phys,St Catharines/ON L2S 3A1/Canada/

Journal: JOURNAL OF PHYSICAL CHEMISTRY B , 2007 , V 111 , N10 (MAR 15) , P 2477-2483

ISSN: 1520-6106 **Publication Date:** 20070315

Publisher: AMER CHEMICAL SOC , 1155 16TH ST, NW, WASHINGTON, DC 20036 USA

Language: English **Document Type:** ARTICLE

Geographic Location: Canada

Journal Subject Category: CHEMISTRY, PHYSICAL

Abstract: Lipopolysaccharides (LPSs) are a major class of macromolecules populating the surface of Gram-negative bacteria. They contribute significantly to the bacterium's surface properties and play a crucial role in regulating the permeability of its outer membrane. Here, we report on neutron diffraction studies performed on aligned, self-assembled bilayers of LPS isolated from *Pseudomonas aeruginosa* PAO1. This LPS system is comprised of a mixture of rough and smooth A-band and B-band LPS, similar to that naturally found in *P. aeruginosa*. Temperature scans were conducted at various levels of hydration, and the phases adopted by LPS, along with their corresponding transition temperatures, have been identified. Because of LPS's chemical heterogeneity, the gel-to-liquid-crystalline transition was continuous and not abrupt as commonly observed in single-component phospholipid systems. From the construction of one-dimensional scattering length density profiles, we find that water penetrates into the hydrocarbon region up to and including the center of liquid-crystalline LPS bilayers. This permeability to water also extends to bilayers in the continuous phase transition region and could have far-reaching implications as to how small molecules penetrate the outer membrane of Gram-negative bacteria.

Identifiers: KeyWord Plus(R): OUTER-MEMBRANE; X-RAY; SALMONELLA-TYPHIMURIUM; BACTERIAL LIPOPOLYSACCHARIDES; DIVALENT-CATIONS; LIPID-BILAYERS; SEROTYPE O5; PERMEABILITY; CORE; MINNESOTA

Cited References:

BRANDENBURG K, 2003, V338, P2477, CARBOHYD RES
DARVEAU RP, 1983, V155, P831, J BACTERIOL
DING L, 2003, V42, P12251, BIOCHEMISTRY-US
ERNST RK, 1999, V286, P1561, SCIENCE
FERRIS FG, 1986, V32, P594, CAN J MICROBIOL
FRANKS NP, 1979, V133, P469, J MOL BIOL
GARIDEL P, 2005, V1715, P122, BBA-BIOMEMBRANES
HANCOCK REW, 1978, V136, P381, J BACTERIOL
HARROUN TA, 2006, V45, P1227, BIOCHEMISTRY-US
KAMIO Y, 1976, V15, P2561, BIOCHEMISTRY-US
KASTOWSKY M, 1993, V217, P771, EUR J BIOCHEM
KATSARAS J, 2001, P25, LIPID BILAYERS STRUC
KATSARAS J, 1995, V73, P209, BIOCHEM CELL BIOL
LABISCHINSKI H, 1985, V162, P9, J BACTERIOL
LAM JS, 2004, V3, P3, PSEUDOMONAS
NAUMANN D, 1989, V214, P213, J MOL STRUCT
NIEH MP, 2005, V21, P6656, LANGMUIR
NIKAIKO H, 2003, V67, P593, MICROBIOL MOL BIOL R
POZONAVAS B, 2003, V91, PHYS REV LETT
ROCCHETTA HL, 1999, V63, P523, MICROBIOL MOL BIOL R
SADOVSKAYA I, 2000, V267, P1640, EUR J BIOCHEM

SADOVSKAYA I, 1998, V255, P673, EUR J BIOCHEM
SEYDEL U, 1993, V110, P232, J STRUCT BIOL
SMIT J, 1975, V124, P942, J BACTERIOL
SNYDER S, 1999, V38, P10758, BIOCHEMISTRY-US
TONG JH, 2004, V86, P3759, BIOPHYS J
VAARA M, 1992, V56, P395, MICROBIOL REV
WILKINSON SG, 1996, V35, P283, PROG LIPID RES
WORCESTER DL, 1976, V100, P359, J MOL BIOL

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3/5/12 (Item 5 from file: 34)

DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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12807369 **Genuine Article#:** 824CR **Number of References:** 32

Title: Glycolipid based cubic nanoparticles: preparation and structural aspects

Author: Abraham T (REPRINT) ; Hato M; Hirai M

Corporate Source: Univ Alberta,Dept Biochem,3-39 Med Sci Bldg/Edmonton/AB T6G 2H7/Canada/ (REPRINT); Univ Alberta,Dept Biochem,Edmonton/AB T6G 2H7/Canada/;

AIST,Nanotechnol Res Inst, Tsukuba Cent 5,Tsukuba/Ibaraki

3058565/Japan/; Gunma Univ,Dept Phys,Maebashi/Gumma 3718510/Japan/

Journal: COLLOIDS AND SURFACES B-BIOINTERFACES , 2004 , V 35 , N2 (MAY 15) , P 107-117

ISSN: 0927-7765 **Publication Date:** 20040515

Publisher: ELSEVIER SCIENCE BV , PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS

Language: English **Document Type:** ARTICLE

Geographic Location: Canada; Japan

Journal Subject Category: BIOPHYSICS; CHEMISTRY, PHYSICAL; MATERIALS SCIENCE, BIOMATERIALS

Abstract: Kinetically stable cubic colloidal particle dispersion was produced from a glycolipid using a novel preparation strategy based on the dialysis principle. The use of synchrotron small-angle X-ray diffraction (SSAXD) permitted the identification of exact structure of these dispersed particles in the colloidal state. Dynamic light scattering methods were used to obtain size and size distributions. A glycoside, 1-O-phytanyl-beta-D-xyloside (beta-XP), that exhibits Pn3m cubic phase in an excess aqueous medium, was used as the lipid material. The dialysis technique includes controlled stirring action both inside and outside of the dialysis membrane tube. Initially, a mixed micellar system composed of beta-XP, n-octyl-beta-D-glucopyranoside (beta-OG) and a triblock copolymer, Pluronic F127 (PL) was prepared in the aqueous medium. About 10 wt.% of PL to lipid weight was found to be sufficient to produce stable colloidal dispersions. The mean volume diameter of these colloidal particles was found to be in the range of 0.85 +/- 0.05 mum. The cubic phase structure of these colloidal particles is greatly depended on the final beta-OG concentration level in the system. Coexistence of Im3m and Pn3m

cubic structures has been identified in these colloidal particles. This coexistence has the characteristics of Bonnet relation, which forms a compelling case for the infinite periodic minimal surface (IPMS) descriptions. These colloidal particles could restore pure Pn3m, phase structure, but a longer dialysis time was needed. This work, in general, will open up new possibilities for membrane protein reconstitution and other relevant biological applications using colloidal cubic lipid particles. (C) 2004 Elsevier B.V. All rights reserved.

Descriptors: SCIAuthor Keywords: lipids ; bicontinuous cubic phases ; membranes ; nanoparticles ; X-ray ; Bonnet transformation

Identifiers: KeyWord Plus(R): MEMBRANE-PROTEIN CRYSTALLIZATION; LIPID-WATER PHASES; MESOPHASES; SYSTEMS; BEHAVIOR

Cited References:

US 5531925, 1993, LANDH T
AI X, 2000, V79, P394, BIOPHYS J
CAFFREY M, 2000, V10, P486, CURR OPIN STRUC BIOL
CHEN AH, 1998, V95, P11, CHEM PHYS LIPIDS
DEKRUIJFF B, 1997, V386, P129, NATURE
DRUMMOND CJ, 2000, V4, P449, CURR OPIN COLLOID IN
GORDELIY VI, 2002, V419, P484, NATURE
GUSTAFSSON J, 1997, V13, P6964, LANGMUIR
HATO M, 2002, V18, P3425, LANGMUIR
HATO M, 1999, V80, P233, ADV COLLOID INTERFAC
HYDE ST, 2001, PCH16, HDB APPL SURFACE COL
HYDE S, 1997, LANGUAGE SHAPE
ISRAELACHVILI JN, 1992, INTERMOLECULAR SURFA
JACOB M, 1997, V212, P486, Z KRISTALLOGR
JOHNSSON M, 2001, V17, P3902, LANGMUIR
KUHL TL, 1994, V66, P1479, BIOPHYS J
LANDH T, 1996, THESIS LUND U SWEDEN
LANDH T, 1994, V98, P8453, J PHYS CHEM-US
LANDAU EM, 1996, V93, P14532, P NATL ACAD SCI USA
LARSSON K, 2000, V5, P64, CURR OPIN COLLOID IN
LARSSON K, 1989, V93, P7304, J PHYS CHEM-US
LUZZATI V, 1997, V44, P3, CURR TOP MEMBR
MINAMIKAWA H, 1997, V13, P2564, LANGMUIR
MINAMIKAWA H, 1994, V72, P111, CHEM PHYS LIPIDS
NAKANO M, 2001, V17, P3917, LANGMUIR
SCHOEN AH, 1970, D5541 NASA
SEDDON JM, 1990, V1031, P1, BIOCHIM BIOPHYS ACTA
SHAH JC, 2001, V47, P229, ADV DRUG DELIVER REV
SILVANDER M, 2002, V120, P25, PROG COLLOID POLYM S
SPICER PT, 2001, V17, P5748, LANGMUIR
TEMPLER RH, 1998, V3, P255, CURR OPIN COLLOID IN
WASHINGTON C, 1996, V100, P7603, J PHYS CHEM-US

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3/5/13 (Item 1 from file: 144)

DIALOG(R)File 144: Pascal

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18493078 PASCAL No.: 08-0068273

Continuous biotransformation of pyrogallol to purpurogallin using cross-linked enzyme crystals of laccase as catalyst in a packed- bed reactor

JEGAN ROY J; ABRAHAM T Emilia

Chemical Sciences Division, Regional Research Laboratory (CSIR),
Trivandrum 695 019, India

Journal: Journal of chemical technology and biotechnology :
(1986), 2006, 81 (11) 1836-1839

ISSN: 0268-2575 CODEN: JCTBDC Availability: INIST-560;
354000143010070150

No. of Refs.: 14 ref.

Document Type: P (Serial) ; A (Analytic)

Country of Publication: United Kingdom

Language: English

Cross-linked enzyme crystals (CLEC) of laccase were prepared by

crystallizing laccase with 75% (NH₄ SUB 4)₂ SO₄ and cross-linking

using 1.5% glutaraldehyde. The cross-linked enzyme crystals were further

coated with 1mmolL⁻¹ 1 beta -cyclodextrin by lyophilization.

The

lyophilized enzyme crystals were used as such for the biotransformation of

pyrogallol to purpurogallin in a packed-bed reactor. The maximum conversion

(76.28%) was obtained with 3 mmol L⁻¹ pyrogallol at a residence

time of 7.1s. The maximum productivity (269.03 g L⁻¹ h⁻¹) was obtained with 3 mmol L⁻¹ pyrogallol at a

residence time of 3.5 s. The productivity was found to be 261.14 g L⁻¹ h⁻¹

when concentrations of 3 mmol L⁻¹ and 7 mmol L⁻¹ were used. The reaction rate of purpurogallin synthesis was maximum

(2241.94 mg purpurogallin mg L⁻¹ h⁻¹) at a

residence time of 3.5 s, when 5 mmol L⁻¹ pyrogallol was used as

the substrate. The catalyst to product ratio calculated for the present

biotransformation was 1:2241. The CLEC laccase had very high

stability in

reuse and even after 650 h of continuous use, the enzyme did not lose its

activity.

English Descriptors: Catalyst; Fixed bed reactor; Reaction rate; Kinetics; Stability; Reuse

French Descriptors: Catalyseur; Reacteur lit fixe; Vitesse reaction; Cinetique; Stabilite; Reutilisation

Classification Codes: 001D07H; 001C01A03B

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Dialog eLink: 

3/5/14 (Item 2 from file: 144)

DIALOG(R)File 144: Pascal

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13062436 PASCAL No.: 97-0352907

Markets growing for nanostructured materials

RITTNER M N; ABRAHAM T

Business Communications Co, Norwalk CT, United States

Journal: Materials Technology, 1997

, 12 (2) 70-71

ISSN: 1066-7857 CODEN: MATTEI Availability: E.i.

Document Type: P (Serial) ; A (Analytic)

Country of Publication: United States

Language: English

Nanostructured materials are characterized by highly refined

microstructures that distinguish them from conventional polycrystalline

materials. These unusual properties are responsible for the growing market

in these materials. Nanoparticles are incorporated into

commercially-available abrasive polishing slurries, fire retardant

materials, magnetic fluids, magnetic recording tapes, sunscreens, and

transparent wood stains. By the end of the century, nanostructured

materials are expected to play an increasingly significant role in a number

of major industries.

English Descriptors: Crystallites; Reviews; Marketing; Crystal microstructure; Particles (particulate matter); Toughness; Powders; Electric conductivity of solids; Strength of materials; Hardness; Magnetic properties; Optical properties; Coercive force; Coatings; Nanostructured materials

French Descriptors: Article synthese; Commercialisation; Microstructure cristalline; Particule(matiere particulaire); Durete tenacite; Poudre; Conductivite electrique solide; Resistance materiau; Durete; Propriete magnetique; Propriete optique; Champ coercitif; Revetement; Nanostructure

Classification Codes: 001B60A50; 001D00D; 001B60A66; 001D14C01; 001B40A;

295

Dialog eLink:  INIST (INIST eLink Options)

3/5/15 (Item 3 from file: 144)

DIALOG(R)File 144: Pascal

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12594898 PASCAL No.: 96-0281860

Advanced and specialty glasses continue to grow

ABRAHAM T

Business Communications Co, Inc, Norwalk CT, United States

Journal: Materials Technology, 1996

, 11 (1) 1p

ISSN: 1066-7857 CODEN: MATTEI Availability: E.i.

Document Type: P (Serial) ; A (Analytic)

Country of Publication: United States

Language: English

Both the advanced and specialty glasses play important roles in the telecommunication and electronics industries. For the last two decades,

these materials have emerged as one of the newest groups of high technology

materials. Several new glass compositions and processing techniques have

also been developed to suit the increasing number of applications.

English Descriptors: Biocompatible implants; Ceramic processing;

Reviews;

Composition; Chemical operations; Ceramic materials; Optical fibers;

Liquid crystal displays; Implants (surgical); Dental materials;

Composite

materials; Sintering; Sol-gels; Comminution; Vapor deposition; Glass

French Descriptors: Article synthese; Composition; Operation chimique; Ceramique; Fibre optique; Affichage cristal liquide;

Implant(chirurgie);

Produit dentaire; Materiail composite; Frittage; Sol gel; Comminution;

Depot phase vapeur; Verre

Classification Codes: 001D08B06C; 001C01; 001D07X; 001D08B04D;
001D03G02C1;
001B40B

Dialog eLink:

3/5/16 (Item 4 from file: 144)

DIALOG(R)File 144: Pascal

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11722459 PASCAL No.: 94-0587472

**On the thickness of ferroelastic twin walls in lead phosphate Pb SUB 3 (PO SUB 4)
SUB 2 a X-ray diffraction study**

WRUCK B; SALJE E K H; ZHANG M; ABRAHAM T; BISMAYER U

Univ. Cambridge, dep. earth sci., Cambridge CB2 3EQ, United Kingdom

Journal: Phase transitions, 1994

, 48 (1-3) 135-148

ISSN: 0141-1594 CODEN: PHTRDP Availability: INIST-18257
; 354000040009400070

No. of Refs.: 22 ref.

Document Type: P (Serial) ; A (Analytic)

Country of Publication: United Kingdom

Language: English

English Descriptors: Experimental study; Thickness; XRD; Crystal twin;
Domain wall; Ferroelastic domain; Lead phosphates; Ternary compounds;
Structure factors

Broad Descriptors: Inorganic compounds; Compose mineral

French Descriptors: Etude experimentale; Epaisseur; XRD; Macle; Paroi
domaine; Domaine ferroelastique; Plomb phosphate; Compose ternaire;
Facteur structure; 6172M; Pb₃(PO₄)₂; O P Pb

Classification Codes: 001B60A72M

Dialog eLink:

3/5/17 (Item 5 from file: 144)

DIALOG(R)File 144: Pascal

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11596175 PASCAL No.: 94-0482854

**Analysis and removal of impurities and defects in reactive ion etched silicon using a
novel depth-profiling technique**

CHANG W H; HUANG L J; LAU W M; MITCHELL I V; ABRAHAM T; KING M

Surface Science Western and Department of Materials Engineering,
University of Western Ontario, London, Ontario N6A 5B7, Canada;
Department
of Physics, University of Western Ontario, London, Ontario N6A 3K7,
Canada;
Northern Telecom Electronics Ltd., P.O. Box 3511, Ottawa, Ontario K1Y
4H7,
Canada

The 40th National Symposium of the American Vacuum Society (Orlando,
Florida (USA)) 1993-11-15/1993-11-19

Journal: Journal of Vacuum Science and Technology A
, 1994-07, 12 (4
) 2357-2362

ISSN: 0734-2101 CODEN: JVTAD6 Availability:
INIST-11992A

Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)
Country of Publication: USA

Language: English

The analysis and removal of residual damage induced by reactive ion etching of silicon were studied with a new ultrashallow depth-profiling technique of silicon. In this technique, which is known to give a depth resolution of better than 0.5 nm (Lau et al., Appl. Phys. Lett. 63, 78 (1993)), a few atomic layers of silicon were oxidized by an ultraviolet/ozone exposure at room temperature and subsequently removed by an HF wet etch. In the present study, the compositional changes during depth profiling and the amount of silicon removed per oxidation/etch cycle were estimated by x-ray photoelectron spectroscopy. In addition, Rutherford backscattering spectroscopy was used to confirm the compositional changes and to measure defect depth distributions. Further, surface-charge spectroscopy was applied to determine the minimum oxidation/etching required to completely remove Fermi-level pinning associated with the residual damage. The results showed that these profiling and analysis techniques, when applied in a coherent manner, can provide an accurate picture of the residual damage induced by reactive ion etching. More importantly, the study also showed that the oxidation/etching technique can be applied as a well-controlled process for removing the residual damage.

English Descriptors: Experimental study; Measuring methods; Silicon; Etching; Plasma sources; Depth profiles; Crystal defects; Impurities;

Oxidation; Fermi level; RBS; Photoelectron spectroscopy; Reactive sputtering

French Descriptors: Etude experimentale; Methode mesure; 7920R; 8160C; 8280P; Silicium; Gravure; Source plasma; Profil profondeur; Defaut cristallin; Impurete; Oxydation; Niveau Fermi; RBS; Spectrometrie photoelectron; Pulverisation reactive

Classification Codes: 001B70I20R; 001B80A60C; 001C04C

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Dialog eLink: [INIST/CNRS \(French version\)](#)

3/5/18 (Item 6 from file: 144)

DIALOG(R)File 144: Pascal

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04815085 PASCAL No.: 83-0059889

Etching and dissolution mechanism of cadmium oxalate trihydrate crystals

ARORA S K; ABRAHAM T

Sardar Patel Univ., Dep. Physics, Gujarat, India

Journal: Cryst. Res. Technol. (1979),

1982, 17 (4) 489-495

ISSN: 0232-1300 Availability: CNRS-13690

No. of Refs.: 14 ref.

Document Type: P (Serial) ; A (Analytic)

Country of Publication: German Democratic Republic

Language: English

Etude de l'attaque des dislocations et de la dissolution des cristaux du

titre, obtenus par la methode du gel, en utilisant differents attaquants.

L'etude revele l'existence d'un reseau de dislocations dans le corps du

cristal et de boucles de dislocation peu profondes dans la sous-structure.

La dissolution plus rapide du cristal aux temperatures elevees montre que

la vitesse de dissolution dans l'etape initiale est tres inferieure pour

augmenter rapidement ensuite et atteindre une valeur constante

English Descriptors: Chemical etching; Experimental study; Dislocation loop

; Carboxylate; Saturated aliphatic compound; Inorganic compound; Etch pit

; Gel growth; Substructure; Kinetics; Temperature; Cadmium Compounds; Mechanism; Transition metal Compounds; Dislocation; Inverse crystal growth; Organic salt

French Descriptors: Attaque chimique; Etude experimentale; Boucle

dislocation; Carboxylate; Compose aliphatique sature; Compose mineral;

Figure attaque; Methode gel; Sous structure; Cinetique; Temperature; Cadmium Compose; Mecanisme; Metal transition Compose; Dislocation; Decroissance cristalline; Sel organique; Cadmium oxalate,hydrate

Classification Codes: 161A13E

Dialog eLink: [INIST Full Text Reference Opinions](#)

3/5/19 (Item 7 from file: 144)

DIALOG(R)File 144: Pascal

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03829975 PASCAL No.: 82-0353139

KINETICS OF ETCHING AND DISSOLUTION OF GEL-GROWN CDC SUB 2 O SUB 4.3H SUB 2 O CRYSTALS

ARORA S K; ABRAHAM T

SARDAR PATEL UNIV., DEP. PHYS./VALLABH VIDYANAGAR 388120, INDIA

Journal: J. MATER. SCI., 1982

, 17 (6) 1723-1728

ISSN: 0022-2461 Availability: CNRS-12733

No. of Refs.: 11 REF.

Document Type: P (SERIAL) ; A (ANALYTIC)

Country of Publication: UNITED KINGDOM

Language: ENGLISH

CONTRAIREMENT A DE PRECEDENTES ETUDES, L'ENERGIE D'ACTIVATION
DU

PROCESSUS D'EROSION DANS DES SOLVANTS POUR LEQUEL LE MECANISME
DE

DISSOLUTION EST CONTROLE PAR REACTION CHIMIQUE EST INFERIEURE A CELLE
POUR

LAQUELLE LE PROCESSUS DE DISSOLUTION EST CONTROLE PAR LA DIFFUSION
DES

ESPECES CHIMIQUES

English Descriptors: INORGANIC COMPOUND; TRANSITION METAL COMPOUNDS;

SATURATED ALIPHATIC COMPOUND; CHEMICAL ETCHING; DISSOLUTION;

KINETICS;

GEL METHOD; EXPERIMENTAL STUDY; INVERSE CRYSTAL GROWTH; ORGANIC SALT;
ETCHING; GEL GROWTH

English Generic Descriptors: CRYSTALLOGRAPHY

French Descriptors: COMPOSE MINERAL; METAL TRANSITION COMPOSE; COMPOSE
ALIPHATIQUE SATURE; ATTAQUE CHIMIQUE; DISSOLUTION; CINETIQUE; METHODE
GEL

; ETUDE EXPERIMENTALE; DECREMENT CRISTALLINE; SEL ORGANIQUE;
CADMIUM

OXALATE, HYDRATE

French Generic Descriptors: CRISTALLOGRAPHIE

Dialog eLink:

3/5/20 (Item 1 from file: 357)

DIALOG(R)File 357: Derwent Biotech Res.
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0376179 DBA Accession No.: 2005-21885 PATENT

Preparing cross-linked enzyme crystals of hydrolases and oxidoreductases which are solvent tolerant, thermostable and shear resistant by reacting the crystals of the enzyme with a multifunctional crosslinking agent glucoamylase, peroxidase, protease crystallization and lyophilization

Author: ABRAHAM T E; BINDHU L V

Patent Assignee: COUNCIL SCI and IND RES SOUTH AFRICA 2005

Patent Number: WO 200566341 **Patent Date:** 20050721 **WPI Accession No.:** 2005-506871 (200551)

Priority Application Number: WO 2004IN000002 **Application Date:** 20040101

National Application Number: WO 2004IN2 **Application Date:** 20040101

Language: English

Abstract: DERWENT ABSTRACT: NOVELTY - Preparing cross linked enzyme crystals of hydrolases and oxidoreductases which are solvent tolerant, thermostable and shear resistant comprises: (1) crystallizing the enzymes in aqueous buffer; (2) reacting the crystals of the enzyme with a multifunctional crosslinking agent; (3) washing the cross linked crystals with a reagent; and (4) coating cross linked protein crystals with a surfactant. DETAILED DESCRIPTION - Preparing cross linked enzyme crystals of hydrolases and oxidoreductases which are solvent tolerant, thermostable and shear resistant comprises: (1) crystallizing the enzymes in aqueous buffer with suitable salts and cosolvents in the presence of surfactants at a temperature ranging from 4degreesC to 10degreesC for a period ranging between 5 hrs to 15 days to obtain the crystals of the protein having a particle size ranging from 50 to 150 microns; (2) reacting the crystals of the enzyme obtained in step (1) with a multifunctional crosslinking agent in the presence of buffer of pH ranging from 3-8 at a temperature ranging from 4degreesC to 25degreesC to get the crossed linked enzyme crystal; (3) washing the cross linked crystals with a reagent that is capable of removing the excess of the multifunctional cross linking reagent so as to obtain the washed cross linked protein; and (4) coating cross linked protein crystals with a suitable surfactant, and lyophilizing them to obtain the stable product. An INDEPENDENT CLAIM is included for a process of continuous generation of glucose solution making use of the cross-linked enzyme crystal. BIOTECHNOLOGY - Preferred Method: Preparing cross linked enzyme crystals of hydrolases and oxidoreductases which are solvent tolerant, thermostable and shear resistant comprises: (1) crystallizing the enzymes in aqueous buffer with a suitable salts and cosolvents in the presence of

surfactants at a temperature ranging from 4degreesC to 10degreesC for a period ranging between 5 hrs to 15 days to obtain the crystals of the protein having a particle size ranging from 50 to 150 microns; (2) reacting the crystals of the enzyme obtained in step (1) with a multifunctional crosslinking agent in the presence of buffer of pH ranging from 3-8 at a temperature ranging from 4degreesC to 25degreesC to get the crossed linked enzyme crystal; (3) washing the cross linked crystals with a reagent that is capable of removing the excess of the multifunctional cross linking reagent so as to obtain the washed cross linked protein; and (4) coating cross linked protein crystals with a suitable surfactant, and lyophilizing them to obtain the stable product. The enzymes comprise hydrolases and the enzyme is a starch hydrolyzing amylase namely glucoamylase. The oxidoreductase enzyme is a plant peroxidase. The oxidase comprises the group of plant peroxidases consisting of Horseradish, Ipomea or Saccharum peroxidases. The crystallizing salt is sulphate of ammonium or sodium either as saturated solution or crystals. The buffer used for the cross-linked glucoamylase preparation is an aqueous buffer of 1OmM-0.5M of acetate having a pH of 4.5. The buffer used for the cross-linked peroxidase preparation is an aqueous buffer of 1OmM -0.5M phosphate or tris having pH of 6.5-8.0. The co-solvent is an alcohol having a concentration of 1-20%, example 2-methyl,2,4 pentane diol, 2-propanol, 1,5 pentane diol, ethanol, methanol or isoamyl alcohol. The crystal is a microcrystal of 150 microns or less. The cross linking reagent used is glutaraldehyde or starch dialdehyde. The surfactant used is anionic, non-ionic, or cationic. The cationic surfactant used is cetyl trimethyl ammonium bromide or cetrimide. The anionic surfactant used is dioctyl sulfosuccinate Aerosol OT. The non-ionic surfactant used is alkyl phenol ethoxylate, sorbitan trioleate, sorbitan tristerate, Examples Tween 20, Tween 80 or Triton X-100. The surfactant provides a weight ratio of crosslinked enzyme crystals to surfactant between about 1:1 and 1:5, preferably between about 1:1 and 1:2 and is in a lyophilized form. The cross-linked glucoamylase is active in 1:1 mixture of water organic solvents n-dodecane; n-hexane; chloroform; or dimethyl sulphoxide. The crosslinked enzyme crystal is having resistance to exogenous proteolysis, such that the crosslinked enzyme crystal retains at least 91% of its initial activity after incubation for three hours in the presence of a concentration of Protease that causes the soluble uncross linked form of the enzyme that is crystallized to form the enzyme crystal that is cross-linked to lose at least 94% of its initial activity under the same conditions, where the crystal is in lyophilized form. The cross-linked Peroxidases are active in organic solvents like toluene; 80% dioxane, chloroform; 2-propanol; chloroform; acetone; ethanol; acetonitrile; methanol; and dioxane. The crystals of plant peroxidase especially Horse radish peroxidase produces 2, 4 dimethyl phenol dimer from monomer dissolved either in 2-propanol or toluene and the catalysis carried out at 50degreesC for 30 min in the presence of 30% H₂O₂. The process of continuous generation of glucose solution making use of the cross linked enzyme crystal comprises packing the cross linked glucoamylase crystals in a jacketed column for the continuous saccharification of starch solution having a concentration of 1-20%, preferably 4-10%(W/V) at pH 4.5 and at 60degreesC with a yield of 110g glucose/L/hour at a residence time of 7.6 min. The enzyme can also act upon a solution of 1-30%(W/V) of maltodextrin of DE 10-15 preferably 10%(W/V) maltodextrin with a DE of 10-14 at a pH of 4.5, at 60degreesC thereby producing glucose solution within 1-8 min with a yield of 463 to 714 g/L/h. USE - The method is useful in preparing cross-linked enzyme crystals

of hydrolases and oxidoreductases which are solvent tolerant, thermostable and shear resistant (claimed).(44 pages)

Descriptors: hydrolase, oxidoreductase, glucoamylase, horseradish, Ipomea sp., Saccharum sp. peroxidase, protease crystal prep., crystallization, lyophilization thermostable enzyme EC-3.2.1.3 EC-1.11.1.7 plant Armoracia rusticana sugarcane grass (24, 35)

Section: BIOMANUFACTURING and BIOCATALYSIS-Biocatalyst Isolation and Characterization

3/5/21 (Item 1 from file: 434)

DIALOG(R)File 434: SciSearch(R) Cited Ref Sci

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04761156 **Genuine Article#:** PM502 **Number of References:** 21

Title: INDENTATION STUDY OF CADMIUM OXALATE TRIHYDRATE SINGLE-CRYSTALS

Author: ARORA SK; ABRAHAM T; RAO GST; GODBOLE RS

Corporate Source: SARDAR PATEL UNIV,DEPT PHYS/VALLABH VIDYANAGAR 388120/GUJARAT/INDIA/

Journal: JOURNAL OF MATERIALS SCIENCE , 1982 , V 17 , N10 , P 2825-2830

Language: ENGLISH **Document Type:** ARTICLE

Geographic Location: INDIA

Subfile: SciSearch; CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Technology & Applied Sciences

Journal Subject Category: MATERIALS SCIENCE

Descriptors: SCI

Cited References:

ALMOND EM, 1973, SCANNING ELECTRON MI

ARMSTRONG RW, 1973, CH13 SCI HARDNESS TESTING

ARORA SK, 1982, V17, P489, CRYSTAL RES TECH

ARORA SK, 1981, V19, P199, INDIAN J PURE AP PHY

ARORA SK, 1981, V52, P851, J CRYSTAL GROWTH

ARORA SK, 1982, V17, J MATER SCI

BOYARSKAYA YS, 1973, V8, P1367, KRISTALL TECHNIK

BOYARSKAYA YS, 1968, SCLEROMETRY

BRASEN D, 1976, V11, P791, J MATER SCI

BROOKES CA, 1973, CH15 SCI HARDNESS TESTING

BUCKLE H, 1960, ESSAI MICRODURETE SE

BUCKLE H, 1959, V4, P49, METALL REV

DANIELS FW, 1949, V41, P419, T ASM

DEKKER EHLJ, 1974, V9, P1839, J MATER SCI

LAWN B, 1975, V10, P1049, J MATER SCI

LAWN BR, 1977, V12, P2195, J MATER SCI

TABOR D, 1951, HARDNESS METALS

TSINZERLING LG, 1970, V14, P897, SOV PHYS CRYSTALL

WESTBROOK JH, 1968, V53, P1899, AM MINERAL
WESTWOOD ARC, 1967, V16, P505, PHIL MAG
WESTWOOD ARC, 1968, V17, P951, PHIL MAG

3/5/22 (Item 2 from file: 434)
DIALOG(R)File 434: SciSearch(R) Cited Ref Sci
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04584778 **Genuine Article#:** NW655 **Number of References:** 11
Title: KINETICS OF ETCHING AND DISSOLUTION OF GEL-GROWN
CDC₂O₄-3H₂O CRYSTALS
Author: ARORA SK; ABRAHAM T
Corporate Source: SARDAR PATEL UNIV,DEPT PHYS/VALLABH
VIDYANAGAR 388120/GUJARAT/INDIA/
Journal: JOURNAL OF MATERIALS SCIENCE , 1982 , V 17 , N6 , P 1723-1728
Language: ENGLISH **Document Type:** ARTICLE
Geographic Location: INDIA
Subfile: SciSearch; CC PHYS--Current Contents, Physical, Chemical & Earth Sciences;
CC ENGI--Current Contents, Engineering, Technology & Applied Sciences
Journal Subject Category: MATERIALS SCIENCE
Descriptors: SCI
Cited References:
ABRAHAM T, 1981, THESIS SARDAR PATEL
ABRAMSON MB, 1939, V61, P2290, J AM CERAM SOC
ARORA SK, 1981, V52, P851, J CRYSTAL GROWTH
BATTERMAN BW, 1957, V28, P1236, J APPL PHYS
BOGENSCHUTZ AF, 1967, V114, P970, J ELECTROCHEM SOC
GATOS HC, 1975, CRYSTAL GROWTH CHARA
GATOS HC, 1960, V31, P743, J APPL PHYS
GILMAN JJ, 1956, V27, P1018, J APPL PHYS
TUCK B, 1975, V10, P321, J MATER SCI
TUCK B, 1976, V11, P847, J MATERIAL SCI
WARIKOIS EP, 1962, V33, P690, J APPL PHYS

3/5/23 (Item 3 from file: 434)
DIALOG(R)File 434: SciSearch(R) Cited Ref Sci
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03891564 **Genuine Article#:** LP587 **Number of References:** 5
Title: CONTROLLED NUCLEATION OF CADMIUM OXALATE IN SILICA
HYDROGEL AND CHARACTERIZATION OF GROWN CRYSTALS
Author: ARORA SK; ABRAHAM T
Corporate Source: SARDAR PATEL UNIV,DEPT PHYS/VALLABH

VIDYANAGAR 388120/GUJARAT/INDIA/

Journal: JOURNAL OF CRYSTAL GROWTH , 1981 , V 52 , APR , P 851-857

Language: ENGLISH **Document Type:** ARTICLE

Geographic Location: INDIA

Subfile: SciSearch; CC PHYS--Current Contents, Physical, Chemical & Earth Sciences

Journal Subject Category: CRYSTALLOGRAPHY

Descriptors: SCI

Cited References:

BRIDLE C, 1965, V19, P483, ACTA CRYSTALLOGR DEN

DENNIS J, 1967, V114, P263, J ELECTROCHEM SOC

EGLI PH, 1970, ART SCI GROWING CRYST

HENISCH HK, 1970, CRYSTAL GROWTH GELS

TOMAZIC B, 1979, V46, P355, J CRYSTAL GROWTH

3/5/24 (Item 4 from file: 434)

DIALOG(R)File 434: SciSearch(R) Cited Ref Sci

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03826669 **Genuine Article#:** LJ563 **Number of References:** 4

Title: CONTROLLED NUCLEATION AND GROWTH OF CADMIUM OXALATE TRIHYDRATE CRYSTALS IN SILICA HYDROGEL

Author: ARORA SK; ABRAHAM T

Corporate Source: SARDAR PATEL UNIV,DEPT PHYS/VALLABH

VIDYANAGAR 388120/GUJARAT/INDIA/

Journal: INDIAN JOURNAL OF PURE & APPLIED PHYSICS , 1981 , V 19 , N3 , P 199-203

Language: ENGLISH **Document Type:** ARTICLE

Geographic Location: INDIA

Subfile: SciSearch; CC PHYS--Current Contents, Physical, Chemical & Earth Sciences

Journal Subject Category: PHYSICS

Descriptors: SCI

Cited References:

BRIDLE C, 1965, V19, P483, ACTA CRYSTALLOGR DEN

DENNIS J, 1967, V114, P263, J ELECTROCHEM SOC

EGLI PH, 1970, ART SCI GROWING CRYST

HENISCH HK, 1970, CH4 CRYSTAL GROWTH GELS

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E4	3	AU=BINDHU L.B.V.
E5	2	AU=BINDHU L.V.

E6 1 AU=BINDHU LAXMI BAI VASANTHAKUMARI
E7 1 AU=BINDHU LAXMI BAI VASANTHAKUMARL
E8 2 AU=BINDHU LBV
E9 2 AU=BINDHU LV
E10 2 AU=BINDHU M.

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2 AU=BINDHU LV
2 AU=BINDHU L.V.
S4 8 AU='BINDHU L V' OR AU='BINDHU LV' OR AU='BINDHU L.V.'

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24 S3
S6 3 S5 NOT S3

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6/5/1 (Item 1 from file: 34)
DIALOG(R)File 34: SciSearch(R) Cited Ref Sci
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11655145 Genuine Article#: 681EJ Number of References: 39

Title: Preparation and kinetic studies of surfactant-horseradish peroxidase ion paired complex in organic media

Author: Bindhu LV; Abraham TE (REPRINT)

Corporate Source: CSIR,Reg Res Lab, Biochem Proc & Wastewater Technol Div,Trivandrum 695019/Kerala/India/ (REPRINT); CSIR,Reg Res Lab, Biochem Proc & Wastewater Technol Div,Trivandrum 695019/Kerala/India/

Journal: BIOCHEMICAL ENGINEERING JOURNAL , 2003 , V 15 , N1 (JUL) , P 47-57

ISSN: 1369-703X **Publication Date:** 20030700

Publisher: ELSEVIER SCIENCE SA , PO BOX 564, 1001 LAUSANNE, SWITZERLAND

Language: English **Document Type:** ARTICLE

Geographic Location: India

Journal Subject Category: BIOTECHNOLOGY & APPLIED MICROBIOLOGY; ENGINEERING, CHEMICAL

Abstract: Horseradish peroxidase was solubilized in organic medium using the technique of ion pairing with the anionic surfactant Aerosol OT (AOT). System parameters like surfactant concentration, pH, ionic strength of the aqueous phase, cosolvent concentration etc. were found to influence the solubilization of HRP. Kinetic behaviour of the ion paired complex towards oxidation of o-phenylenediamine (OPD) in three different solvent systems-aqueous, aqueous-organic monophasic and aqueous-organic biphasic system was investigated. Steady state kinetics of ion paired HRP revealed that ion pairing of the enzyme with the surfactant resulted in an increase in the apparent K-m and a decrease in V-max values of the enzyme in aqueous medium. Enzyme-substrate affinity (K-m) showed an improvement for the ion paired enzyme in organic solvents and was found to decrease with increase in hydrophobicity of the solvent with the ion paired enzyme exhibiting the least K-m value in the most hydrophobic solvent toluene. There was an eightfold decrease in Km value in toluene compared to that in aqueous medium. Among the two types of non-aqueous systems used for the study, V-max was found to be higher in the microaqueous system (toluene). Ion paired HRP exhibited very high catalytic efficiency (K-cat/K-m) in toluene compared to that of native HRP. (C) 2002 Elsevier Science B.V. All rights reserved.

Descriptors: SCIAuthor Keywords: enzyme biocatalysis ; enzyme activity ; horseradish peroxidase ; solubilization ; enzyme technology

Identifiers: KeyWord Plus(R): ENZYMATIC CATALYSIS; REVERSE MICELLES; PROTEIN EXTRACTION; AEROSOL OT; SOLVENTS; ENZYMES; WATER; OPTIMIZATION; CHYMOTRYPSIN; SYSTEMS

Cited References:

- ADAM W, 1998, V63, P6123, J ORG CHEM
- ALTREUTER DH, 2002, V31, P10, ENZYME MICROB TECH
- AVEYARD R, 1986, V82, P1755, J CHEM SOC FARAD T 1
- BRATKO D, 1988, V89, P545, J CHEM PHYS
- CHILDS RE, 1975, V145, P93, BIOCHEM J
- LONGO MA, 1997, V58, P21, J BIOTECHNOL
- DORDICK JS, 1989, V11, P194, ENZYME MICROB TECH
- EREMIN AN, 1990, V26, P764, PRIKL BIOKhim MIKRO
- GOKLEN KE, 1985, V1, P69, BIOTECHNOL PROGR
- GORMAN LAS, 1992, V39, P392, BIOTECHNOL BIOENG
- HATTON TA, 1989, P55, SURFACTANT BASED SEP
- JENE Q, 1997, V20, P69, ENZYME MICROB TECH
- KAMIYA N, 1997, V11, P375, BIOTECHNOL TECH
- KAMIYA N, 2000, V16, P52, BIOTECHNOL PROGR

KAZANDJIAN RZ, 1986, V28, P417, BIOTECHNOL BIOENG
KHMELNITSKY YL, 1988, V10, P710, ENZYME MICROB TECHNO
KLIBANOV AM, 1989, V14, P141, TRENDS BIOCHEM SCI
LAANE C, 1987, V30, P81, BIOTECHNOL BIOENG
LEODIDIS EB, 1989, P270, STRUCTURE REACTIVITY
LILLY MD, 1985, P179, BIOCATALYSTS ORGANIC
LIM CH, 2000, V36, P233, PROCESS BIOCHEM
LUISI PL, 1988, V947, P209, BIOCHIM BIOPHYS ACTA
LUISI PL, 1982, V2, P887, SOLUTION BEHAVIOR SU
MADHU S, 2002, V30, P3, ENZYME MICROB TECHNO
MARCOZZI G, 1991, V38, P1239, BIOTECHNOL BIOENG
MARTINEK K, 1986, V155, P453, EUR J BIOCHEM
MATSUURA J, 1993, V115, P1261, J AM CHEM SOC
MATZKE SF, 1992, V40, P91, BIOTECHNOL BIOENG
OKAHATA Y, 1988, P1392, J CHEM SOC CHEM COMM
OKAZAKI SY, 2000, V6, P103, BIOCHEM ENG J
PARADKAR VM, 1994, V43, P529, BIOTECHNOL BIOENG
RAHMAN RS, 1991, V95, P1799, J PHYS CHEM-US
RYU K, 1989, V111, P8026, J AM CHEM SOC
RYU K, 1992, V31, P2588, BIOCHEMISTRY-US
TANI H, 1997, V780, P229, J CHROMATOGR A
THEORELL H, 1943, V17, P7, ARK KEMI MINERAL GEO
WANGIKAR PP, 1993, V115, P12231, J AM CHEM SOC
ZAKS A, 1988, V263, P3194, J BIOL CHEM
ZAKS A, 1988, V8, P259, J BIOTECHNOL

Dialog eLink: 

6/5/2 (Item 2 from file: 34)

DIALOG(R)File 34: SciSearch(R) Cited Ref Sci

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11430710 **Genuine Article#:** 649XT **Number of References:** 46

Title: Immobilization of horseradish peroxidase on chitosan for use in nonaqueous media

Author: Bindhu LV; Abraham ET (REPRINT)

Corporate Source: CSIR,Reg Res Lab, Biochem Proc Div,Ind Estate PO Pappanam Code/Trivandrum 695019/Kerala/India/ (REPRINT); CSIR,Reg Res Lab, Biochem Proc Div,Trivandrum 695019/Kerala/India/

Journal: JOURNAL OF APPLIED POLYMER SCIENCE , 2003 , V 88 , N6 (MAY 9) , P 1456-1464

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Journal Subject Category: POLYMER SCIENCE

Abstract: Chitosan, a natural polysaccharide, was used for the covalent immobilization of horseradish peroxidase, an enzyme of high synthetic utility, with the carbodiimide method. Of the enzyme, 62% was immobilized on chitosan when 1-ethyl-3-(3-dimethylaminopropyl carbodiimide) was used as the peptide coupling agent. The influence of different parameters, such as the enzyme concentration, carbodiimide concentration, and incubation period, on the activity retention of the immobilized enzyme was investigated. Kinetic studies using horseradish peroxidase immobilized on chitosan revealed the effects of several parameters, such as the substrate hydrophilicity and hydrophobicity, the solubility of substrates in the medium, the solvent hydrophobicity, and the support aquaphilicity, on the catalytic activity of the immobilized enzyme in nonaqueous media. General rules for the optimization of solvents for nonaqueous enzymology based on the partitioning of the solvent were not applicable for the immobilized horseradish peroxidase. The catalytic efficiency was greatest when o-phenylene diamine was used as the substrate and least when guaiacol was used. The aquaphilicity of the support played an important role in the kinetics of the immobilized horseradish peroxidase in water-miscible solvents. The results were promising for the future development of chitosan-immobilized enzymes for use in organic media. (C) 2003 Wiley Periodicals, Inc.

Descriptors: SCIAuthor Keywords: enzymes ; catalysis ; supports

Identifiers: KeyWord Plus(R): ORGANIC-SOLVENTS; HYDROGEN-PEROXIDE; ALPHA-CHYMOTRYPSIN; ASPERGILLUS-NIGER; ENZYME; WATER; BEADS; POLYPHENOL; STABILITY; BIOSENSOR

Cited References:

ABDELFATTAH AF, 1997, V68, P189, CHEM ENG J
ADAM W, 1999, V63, P73, ADV BIOCH ENG BIOTEC
ARSEGUEL D, 1990, V3, P227, BIOCATALYSIS
AYYAGARI MSR, 2002, V30, P3, ENZYME MICROB TECH
BLANCO RM, 1992, V39, P75, BIOTECHNOL BIOENG
BRUNO FF, 2000, V41, P1802, P ACS DIV POLYM CHEM
CARVALHO GMJ, 2000, V84, P791, APPL BIOCHEM BIOTECH
CHAPLIN JA, 2001, V13, P69, J MOL CATAL B-ENZYM
CHELLAPANDIAN M, 1998, V33, P595, PROCESS BIOCHEM
CHILDS RE, 1975, V145, P93, BIOCHEM J
COCHRANE FC, 1996, V18, P373, ENZYME MICROB TECH
GORMAN LAS, 1992, V39, P392, BIOTECHNOL BIOENG
GRABSKI AC, 1998, V60, P204, BIOTECHNOL BIOENG
HALLING PJ, 1994, V16, P178, ENZYME MICROB TECHNO
HYNDMANN D, 1992, V40, P1326, BIOTECHNOL BIOENG
ITOYAMA K, 1994, V10, P225, BIOTECHNOL PROGR
KAZANDJIAN RZ, 1987, V28, P4171, BIOTECHNOL BIOENG
KIM J, 1998, V370, P251, ANAL CHIM ACTA
KISE H, 1990, V14, P239, J BIOTECHNOL
KLIBANOV AM, 1981, V103, P6263, J AM CHEM SOC
LEVITSKY VY, 1999, V65, P170, BIOTECHNOL BIOENG
LIM CH, 2000, V36, P233, PROCESS BIOCHEM

LOWRY OH, 1951, V193, P265, J BIOL CHEM
MARTINEK K, 1986, V155, P453, EUR J BIOCHEM
MATTIASSEN B, 1976, V44, P335, METHOD ENZYMOL
MIAO Y, 2001, V437, P87, ANAL CHIM ACTA
MOZHAEV VV, 1990, V35, P653, BIOTECHNOL BIOENG
NODA T, 2001, V44, P189, CARBOHYD POLYM
OGUCHI T, 1999, V20, P401, MACROMOL RAPID COMM
ORTIZ G, 1997, V69, P3521, ANAL CHEM
PARADKAR VM, 1994, V43, P529, BIOTECHNOL BIOENG
PLIURA DH, 1980, V58, P2633, CAN J CHEM
RESLOW M, 1988, V172, P573, EUR J BIOCHEM
RICH JO, 2002, V124, P5254, J AM CHEM SOC
RUIZ AI, 2000, V22, P229, BIOTECHNOL LETT
RYU K, 1990, V3, P1853, RESOUR CONSERV RECY
SAKURAGAWA A, 1998, V374, P191, ANAL CHIM ACTA
SCHWARTZ RD, 1981, V3, P361, ENZYME MICROB TECH
SHIN HJ, 1998, V33, P787, PROCESS BIOCHEM
SISO MIG, 1997, V32, P211, PROCESS BIOCHEM
SKRIKA ALEXOPOUL.E, 1993, V41, P887, BIOTECHNOL BIOENG
SPAGNA G, 2001, V28, P427, ENZYME MICROB TECH
VIANELLO F, 2000, V68, P488, BIOTECHNOL BIOENG
WEHTJE E, 1993, V41, P171, BIOTECHNOL BIOENG
WELIKY N, 1969, V131, P1, ARCH BIOCHEM BIOPHYS
XU JJ, 1998, V10, P713, ELECTROANAL

Dialog eLink:

6/5/3 (Item 1 from file: 357)

DIALOG(R)File 357: Derwent Biotech Res.

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0398740 DBA Accession No.: 2006-12236 PATENT

Preparation of cross linked protein crystals crosslinked enzyme immobilization for use in biosensor and bioremediation

Author: THOLATH A E; BINDHU L V

Patent Assignee: COUNCIL SCI and IND RES INDIA 2006

Patent Number: IN 200300013 **Patent Date:** 20060210 **WPI Accession No.:** 2006-296343 (200631)

Priority Application Number: IN 204N-DE00013 **Application Date:** 20040102

National Application Number: IN 2004DE13 **Application Date:** 20040102

Language: English

Abstract: DERWENT ABSTRACT: NOVELTY - A protein such as an enzyme is immobilized by crosslinking crystals of the protein with a multifunctional crosslinking agent. The crosslinked protein crystals may be lyophilized for storage. A preferred protein is an enzyme such as amyloglucosidase, Horseradish peroxidase, plant

peroxidases etc. Crosslinked enzyme crystals preferably retain at least 90% activity after incubation for three hours in the presence of a concentration of protease that causes the soluble uncrosslinked form of the enzyme to lose at least 92% of its initial activity under the same conditions. Enzyme crystals that are crosslinked may be microcrystals having a cross-section of 100 microns or less. Crosslinked enzyme crystals are sturdy and can withstand harsh conditions and may be used for performing selective chemical reactions in organic or aqueous medium, in an assay, diagnostic kit or biosensor for detecting an analyte, in production of a product such as using crosslinked peroxidase crystals to produce novel polymers, biotransformation including those used in industrial scale chemical processes and in environmental remediations. Image 0/0

Descriptors: amyloglucosidase, horseradish peroxidase protein immobilization, crosslinking crystal, agent, appl. chemical reaction, diagnostic kit, biosensor, polymer prep., biotransformation, bioremediation plant Armoracia rusticana enzyme EC-1.11.1.7 analysis (25, 22)

Section: BIOMANUFACTURING and BIOCATALYSIS-Biocatalyst Application-BIOINFORMATICS and ANALYSIS-Biosensors; WASTE-DISPOSAL AND BIOREMEDIA-TION-Environmental Biotechnology-DIAGNOSTICS-Molecular Diagnostics; OTHER CHEMICALS-Polymers

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? ds

Set	Items	Description
S1	522	AU='ABRAHAM T' OR AU='ABRAHAM T E' OR AU='ABRAHAM T EMILIA'
S2	32	S1 AND CRYSTAL?
S3	24	RD (unique items)
S4	8	AU='BINDHU L V' OR AU='BINDHU LV' OR AU='BINDHU L.V.'
S5	4	RD (unique items)
S6	3	S5 NOT S3

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    $13.20   5 Type(s) in Format 5
    $13.20   5 Types
$14.20  Estimated cost File5
    $0.32    0.047 DialUnits File24
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\$0.13 0.020 DialUnits File28
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$181.37 Estimated total session cost  3.276 DialUnits
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Ended session: 2010/08/31 10:44:03

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